NX-series Pulse Output Unit

NX-PG0□□□

CSM_NX-PG0____DS_E_4_4

Positioning with Pulse Input Type Motor Drivers Such As Stepper Motor Drive

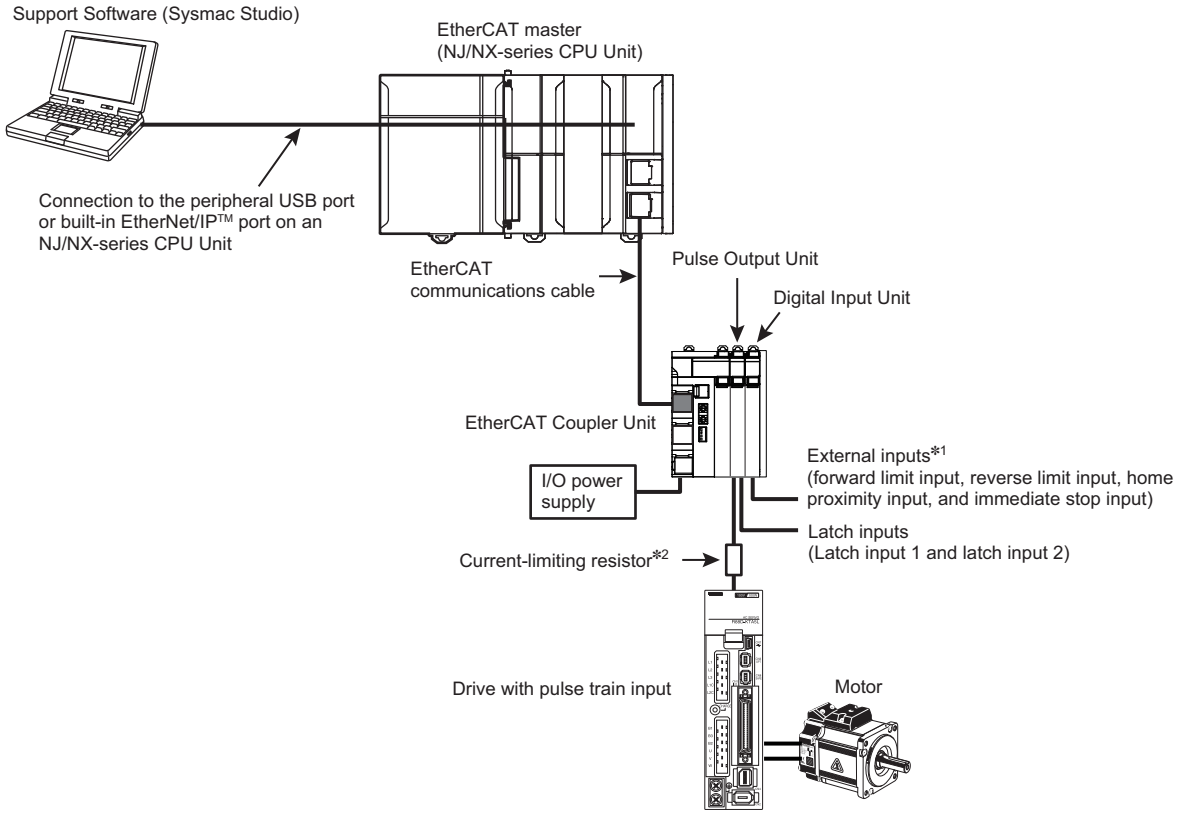
- The MC Function Modules of the NJ-series Machine Automation Controller enable pulse outputs for motor control.
- The same motion control instructions as those for Servomotor control allow you to program single-axis PTP control and interpolation.

Features

- When the motion control instructions of the MC Function Modules of the NJ/NX-series Machine Automation Controller are used, number of usable units is the same as the maximum number of axes controlled by the NJ/NX-series Controller.
- High-speed remote I/O control with communications cycle as fast as 125 μs.*1
- Synchronous I/O refreshing or Task Period Prioritized refreshing *2, can be selected for refreshing with the NX-series EtherCAT Coupler.
- Latch function (2 external latch inputs)
- Maximum pulse output speed: 500 kpps

*1. When using the NX-EC01□□ together with the NX701-□□□□ and NX-ECC203.
*2. Task Period Prioritized refreshing is available when the NX-ECC203 is used together.

System Configuration


Support Software (Sysmac Studio)
EtherCAT master
(NJ/NX-series CPU Unit)
Connection to the peripheral USB port or built-in EtherNet/IP™ port on an NJ/NX-series CPU Unit
EtherCAT communications cable
Pulse Output Unit
Digital Input Unit
EtherCAT Coupler Unit
I/O power supply
External inputs*1
(forward limit input, reverse limit input, home proximity input, and immediate stop input)
Latch inputs
(Latch input 1 and latch input 2)
Current-limiting resistor*2
Drive with pulse train input
Motor

*1. When the Unit is connected to an NJ-series CPU, you can use these inputs by adding a Digital Input Unit and assigning MC Function Module functions.
*2. The pulse output from a Pulse Output Unit is a 24-VDC PNP open collector output. Connect an external current-limiting resistor according to the input specifications of the connected motor drive.
Example: For a G5-series Servo Drive, connect a 2-kΩ (1/2-W) resistor in series.

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Ordering Information

International Standards

- The standards are abbreviated as follows: U: UL, U1: UL(Class I Division 2 Products for Hazardous Locations), C: CSA, UC: cULus, UC1: cULus (Class I Division 2 Products for Hazardous Locations), CU: cUL, N: NK, L: Lloyd, CE: EC Directives, and KC: KC Registration.
- Contact your OMRON representative for further details and applicable conditions for these standards.

Unit type	Product Name	Specification						Model	Standards
		Number of channels	External inputs	External outputs	Maximum pulse output speed	I/O refreshing method *	Number of I/O entry mappings		
NX Series Position Interface Unit	Pulse Output Units	1 (NPN)	2 (NPN)	1 (NPN)	500 kpps	• Synchronous I/O refreshing • Task period prioritized refreshing	1/1	**NX-PG0112**	UC1, CE, KC
		1 (PNP)	2 (PNP)	1 (PNP)				**NX-PG0122**	UC1, N, L, CE, KC

* Refer to information on the I/O refreshing methods in the W524 manual for the communications cycles for each model.

Option

Product Name	Specification	Model	Standards
Unit/Terminal Block Coding Pins	For 10 Units (Terminal Block: 30 pins, Unit: 30 pins)	**NX-AUX02**	–

Product Name	Specification				Model	Standards
	No. of terminals	Terminal number indications	Ground terminal mark	Terminal current capacity		
Terminal Block	16	A/B	None	10 A	**NX-TBA162**	–

Accessories

Not included.

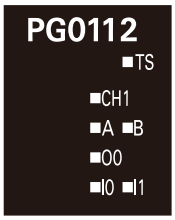
General Specification

Item		Specification
Enclosure		Mounted in a panel
Grounding method		Ground to less than 100 Ω or less
Operating environment	**Ambient operating temperature**	0 to 55°C
	Ambient operating humidity	10% to 95% (with no condensation or icing)
	Atmosphere	Must be free from corrosive gases.
	Ambient storage temperature	–25 to 70°C (with no condensation or icing)
	Altitude	2,000 m max.
	Pollution degree	Pollution degree 2 or less: Conforms to JIS B3502 and IEC 61131-2.
	Noise immunity	Conforms to IEC61000-4-4, 2 kV (power supply line)
	Overvoltage category	Category II: Conforms to JIS B3502 and IEC 61131-2.
	EMC immunity level	Zone B
	Vibration resistance	Conforms to IEC 60068-2-6. 5 to 8.4 Hz with 3.5-mm amplitude, 8.4 to 150 Hz, acceleration of 9.8 m/s^2, 100 min each in X, Y, and Z directions (10 sweeps of 10 min each = 100 min total)
	Shock resistance	Conforms to IEC 60068-2-27. 147 m/s^2, 3 times each in X, Y, and Z directions
Applicable standards		cULus: Listed UL508 and ANSI/ISA 12.12.01 EC: EN 61131-2 and C-Tick, KC Registration, NK, LR

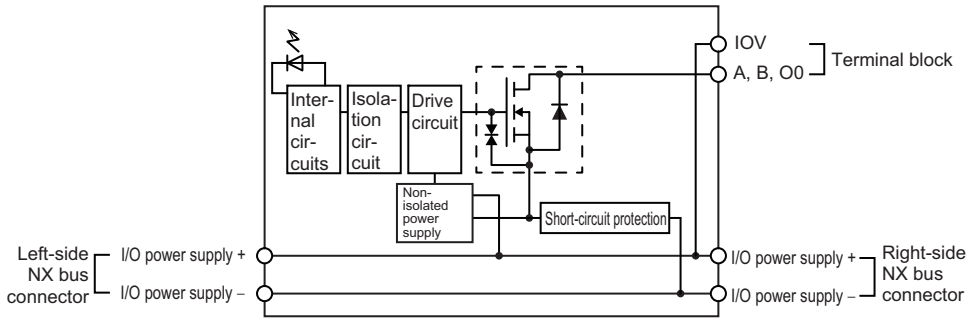
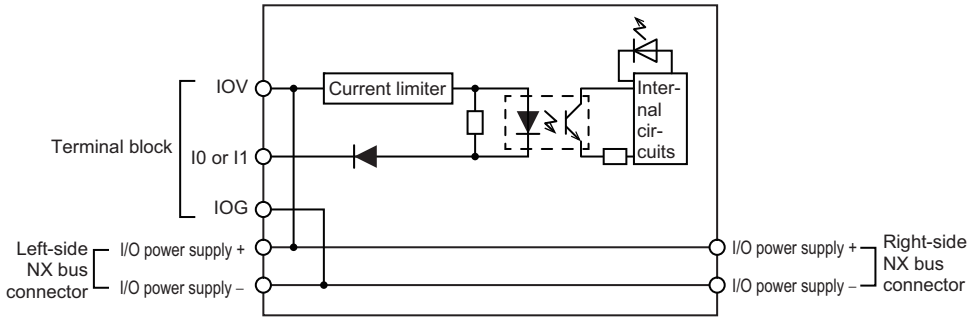
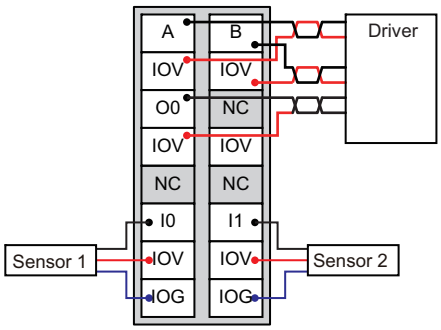
Specification

● Pulse Output Units

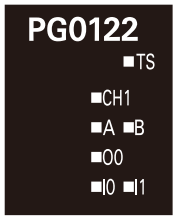
NX-PG0112

Unit name	Pulse Output Units	**Model**	NX-PG0112
Number of axes	1	**Type of external connections**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Synchronous I/O refreshing or task period prioritized refreshing *1		
Indicators		**I/O signals**	Inputs: 2, External inputs Outputs: 3, The outputs are the forward direction pulse output, reverse direction pulse output, and external output (one of each output).
Control method	Open-loop control through pulse string output		
Controlled drive	Servo drive with a pulse string input or a stepper motor drive		
Pulse output form	Open collector output		
Unit of control	Pulses		
Maximum pulse output speed	500 kpps		
Pulse output method	Forward/reverse direction outputs or Pulse + direction outputs		
Position control range	–2,147,483,648 to 2,147,483,647 pulses		
Velocity control range	1 to 500,000 pps		
Positioning *2			
Single-axis position control	Absolute positioning, relative positioning, and interrupt feeding		
Single-axis velocity control	Velocity control (velocity feeding in Position Control Mode)		
Single-axis synchronized control	Cam operation and gear operation		
Single-axis manual operation	Jogging		
Auxiliary function for single-axis control	Homing, stopping, and override changes		
External input specifications			
Input voltage	20.4 to 28.8 VDC (24 VDC +20%/–15%)	**ON voltage/ON current**	15 VDC min./3 mA min.
Input current	4.6 mA typical (24 VDC)	**OFF voltage/OFF current**	4.0 VDC max./1 mA max.
ON/OFF response time	1 μs max./2 μs max.		
Internal I/O common processing	NPN		
Pulse output and external output specifications			
Rated voltage	24 VDC		
Load voltage range	15 to 28.8 VDC	**Residual voltage**	1.0 V max.
Maximum load current	30 mA	**Leakage current**	0.1 mA max.
ON/OFF response time	Pulse output: Refer to "*NX-series Position Interface Units User's Manual* (W524-E1)". External output: 5 μs max./5 μs max.		
Internal I/O common processing	NPN		
Dimensions	12 × 100 × 71 mm (W×H×D)	**Isolation method**	External inputs: Photocoupler isolation External outputs: Digital isolator
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute with leakage current of 5 mA max.
I/O power supply method	Supplied from the NX bus. 20.4 to 28.8 VDC (24 VDC +20%, –15%)	**Current capacity of I/O power supply terminals**	IOV: 0.1 A max. per terminal IOG: 0.1 A max. per terminal
NX Unit power consumption	0.80 W max.	**Current consumption from I/O power supply**	20 mA max.
Weight	70 g max.	**Cable length**	3 m max.

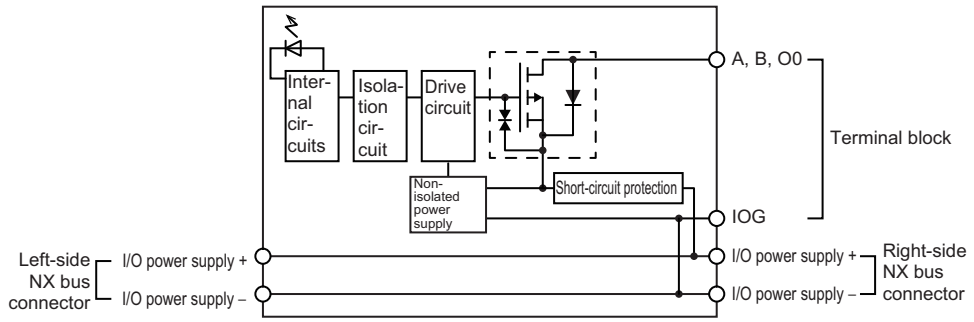
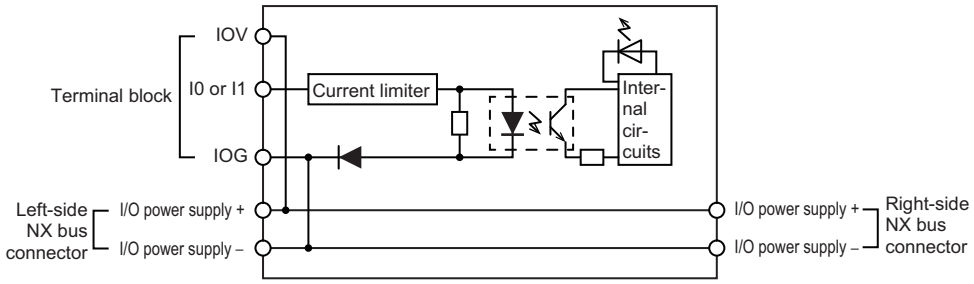
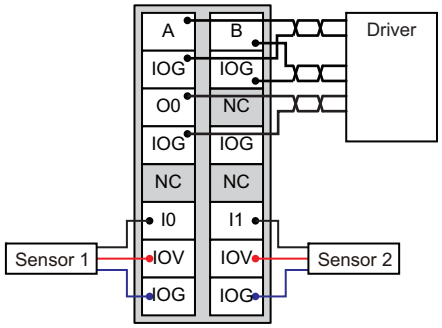
*1. The I/O refreshing method is automatically set according to the connected Communications Coupler Unit and CPU Unit.
*2. These functions are supported when you also use the MC Function Module in the NJ/NX-series CPU Unit.
Refer to the NJ/NX-series CPU Unit Motion Control User's Manual (Cat. No. W507) for details.
A Pulse Output Unit only outputs pulses during the control period based on commands received at a fixed period.
Target position calculations (distribution calculations) for acceleration/deceleration control or for each control period must be performed on the Controller that is connected as the host.

Circuit layout	Pulse Output and External Output  External Inputs 
Installation orientation and restrictions	Installation orientation: 6 possible orientations Restrictions: There are no restrictions.
Terminal connection diagram	
Failure detection	None **Protection** None

NX-PG0122

Unit name	Pulse Output Units	**Model**	NX-PG0122
Number of axes	1	**Type of external connections**	Screwless push-in terminal block (16 terminals)
I/O refreshing method	Synchronous I/O refreshing or task period prioritized refreshing *1		
Indicators		**I/O signals**	External inputs: 2 These are general-purpose inputs. External outputs: 3 These are the forward direction pulse output, reverse direction pulse output, and a general-purpose output.
Control method	Open-loop control through pulse string output		
Controlled drive	Servo drive with a pulse train input or a stepper motor drive		
Pulse output form	Open collector output		
Control unit	Pulses		
Maximum pulse output speed	500 kpps		
Pulse output method	Forward/reverse direction pulse outputs or pulse + direction outputs		
Position control range	–2,147,483,648 to 2,147,483,647 pulses		
Velocity control range	1 to 500,000 pps		
Positioning *2			
Single-axis position control	Absolute positioning, relative positioning, and interrupt feeding		
Single-axis velocity control	Velocity control (velocity feeding in Position Control Mode)		
Single-axis synchronized control	Cam operation and gear operation		
Single-axis manual operation	Jogging		
Auxiliary function for single-axis control	Homing, stopping, and override changes		
External input specifications			
Input voltage	20.4 to 28.8 VDC (24 VDC +20%/–15%)	**ON voltage/ON current**	15 VDC min./3 mA min.
Input current	4.6 mA typical (24 VDC)	**OFF voltage/OFF current**	4.0 VDC max./1 mA max.
ON/OFF response time	1 μs max./2 μs max.		
Internal I/O common processing	PNP		
External output specifications			
Rated voltage	24 VDC		
Load voltage range	15 to 28.8 VDC	**Residual voltage**	1.0 V max.
Maximum load current	30 mA	**Leakage current**	0.1 mA max.
ON/OFF response time	Pulse output: Refer to "*NX-series Position Interface Units User's Manual* (W524-E1)". 5 μs max./5 μs max.		
Internal I/O common processing	PNP		
Dimensions	12 × 100 × 71 mm (W×H×D)	**Isolation method**	External inputs: Photocoupler isolation External outputs: Digital isolator
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute with leakage current of 5 mA max.
I/O power supply source	Supplied from the NX bus. 20.4 to 28.8 VDC (24 VDC +20%/–15%)	**Current capacity of I/O power supply terminals**	IOV: 0.1 A max. per terminal IOG: 0.1 A max. per terminal
NX Unit power consumption	0.90 W max.	**Current consumption from I/O power supply**	20 mA max.
Weight	70 g max.	**Cable length**	3 m max.

*1. The I/O refreshing method is automatically set according to the connected Communications Coupler Unit and CPU Unit.
*2. These functions are supported when you also use the MC Function Module in the NJ/NX-series CPU Unit.
Refer to the NJ/NX-series CPU Unit Motion Control User's Manual (Cat. No. W507) for details.
A Pulse Output Unit only outputs pulses during the control period based on commands received at a fixed period.
Target position calculations (distribution calculations) for acceleration/deceleration control or for each control period must be performed on the Controller that is connected as the host

Circuit layout	Pulse Output and External Output  External Inputs 
Installation orientation and restrictions	Installation orientation: 6 possible orientations Restrictions: There are no restrictions.
Terminal connection diagram	
Failure detection	None
Protection	None

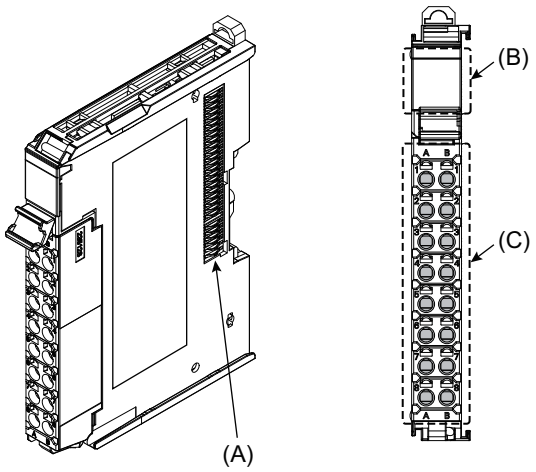
Version Information

NX Units		Corresponding unit versions/versions		
Model	Unit Version	EtherCAT Coupler Units NX-ECC20□ *	NJ/NX-series CPU Units NJ501-□□□□ NJ301-□□□□ NJ101-□□□□ NX701-□□□□	Sysmac Studio
NX-PG0112	Ver.1.1	Ver.1.0 or later	Ver.1.05 or later	Ver.1.10 or higher
NX-PG0122	Ver.1.0			Ver.1.06 or higher
	Ver.1.1			Ver.1.08 or higher

* For the NX-ECC202, there is no unit version of 1.1 or earlier.

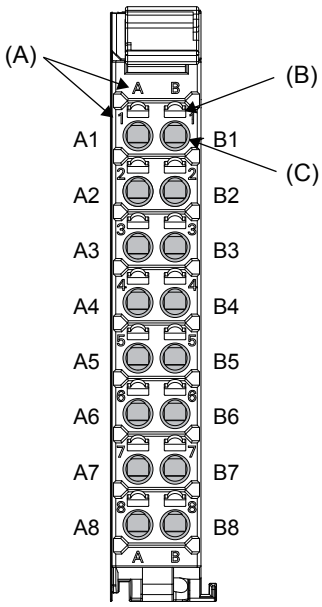
External Interface

NX-PG0112/-PG0122



Letter	Item	Specification
(A)	NX bus connector	This connector is used to connect to another Unit.
(B)	Indicators	The indicators show the current operating status of the Unit.
(C)	Terminal block	The terminal block is used to connect to external devices. The number of terminals depends on the Unit.

Terminal Blocks



12 mm wide
16 terminals

Letter	Item	Specification
(A)	Terminal number indication	The terminal number is identified by a column (A and B) and a row (1 through 8). Therefore, terminal numbers are written as a combination of columns and rows, A1 through A8 and B1 through B8. The terminal number indication is the same regardless of the number of terminals on the terminal block, as shown above.
(B)	Release hole	A flat-blade screwdriver is inserted here to attach and remove the wiring.
(C)	Terminal hole	The wires are inserted into these holes.

Applicable Terminal Blocks for Each Unit Model

Unit model	Terminal Blocks				
	Model	No. of terminals	Terminal number indications	Ground terminal mark	Terminal current capacity
NX-PG0122	NX-TBA162	16	A/B	None	10 A

Applicable Wires

Using Ferrules

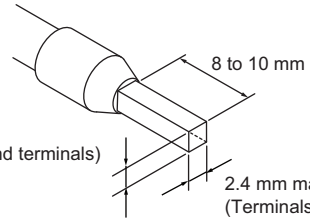
If you use ferrules, attach the twisted wires to them.
Observe the application instructions for your ferrules for the wire stripping length when attaching ferrules.
Always use plated one-pin ferrules. Do not use unplated ferrules or two-pin ferrules.

The applicable ferrules, wires, and crimping tool are given in the following table.

Terminal types	Manufacturer	Ferrule model	Applicable wire (mm^2 (AWG))	Crimping tool
Terminals other than ground terminals	Phoenix Contact	AI0,34-8	0.34 (#22)	Phoenix Contact (The figure in parentheses is the applicable wire size.) CRIMPFOX 6 (0.25 to 6 mm^2, AWG 24 to 10)
		AI0,5-8	0.5 (#20)	
		AI0,5-10		
		AI0,75-8	0.75 (#18)	
		AI0,75-10		
		AI1,0-8	1.0 (#18)	
		AI1,0-10		
		AI1,5-8	1.5 (#16)	
		AI1,5-10		
Ground terminals		AI2,5-10	2.0 *1	
Terminals other than ground terminals	Weidmuller	H0.14/12	0.14 (#26)	Weidmueller (The figure in parentheses is the applicable wire size.) PZ6 Roto (0.14 to 6 mm^2, AWG 26 to 10)
		H0.25/12	0.25 (#24)	
		H0.34/12	0.34 (#22)	
		H0.5/14	0.5 (#20)	
		H0.5/16		
		H0.75/14	0.75 (#18)	
		H0.75/16		
		H1.0/14	1.0 (#18)	
		H1.0/16		
		H1.5/14	1.5 (#16)	
		H1.5/16		

*1. Some AWG 14 wires exceed 2.0 mm^2 and cannot be used in the screwless clamping terminal block.

When you use any ferrules other than those in the above table, crimp them to the twisted wires so that the following processed dimensions are achieved.



1.6 mm max.
(Terminals other than ground terminals)
2.0 mm max.
(Ground terminals)

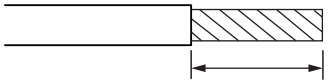
2.4 mm max.
(Terminals other than ground terminals)
2.7 mm max.
(Ground terminals)

Using Twisted Wires/Solid Wires

If you use the twisted wires or the solid wires, use the following table to determine the correct wire specifications.

Terminals		Wire type				Wire size	Conductor length (stripping length)
		Twisted wires		Solid wire			
Classification	Current capacity	Plated	Unplated	Plated	Unplated		
All terminals except ground terminals	2 A max.	Possible	Possible	Possible	Possible	0.08 to 1.5 mm^2 AWG28 to 16	8 to 10 mm
	Greater than 2 A and 4 A or less		Not Possible	Possible *1	Not Possible		
	Greater than 4 A	Possible *1		Not Possible			
Ground terminals	---	Possible	Possible	Possible *2	Possible *2	2.0 mm^2	9 to 10 mm

*1. Secure wires to the screwless clamping terminal block. Refer to the Securing Wires in the USER'S MANUAL for how to secure wires.
*2. With the NX-TB□□□1 Terminal Block, use twisted wires to connect the ground terminal. Do not use a solid wire.



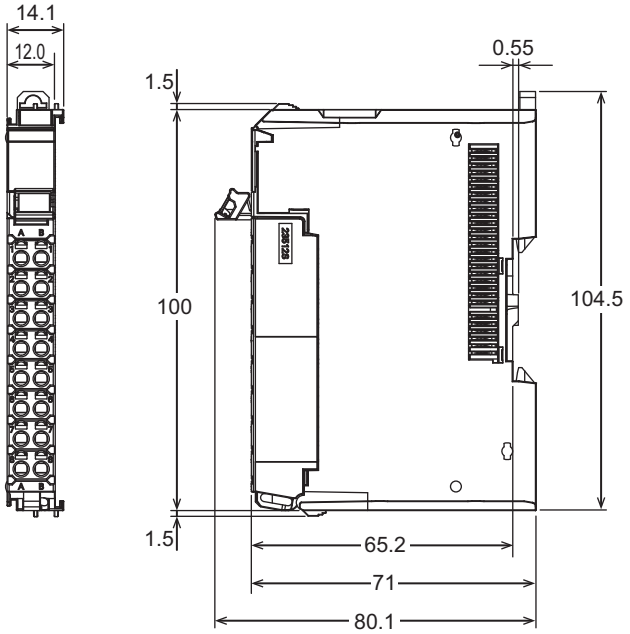
Conductor length (stripping length)

<Additional Information> If more than 2 A will flow on the wires, use plated wires or use ferrules.

Dimensions

(Unit: mm)

NX-PG0112/-PG0122



Related Manuals

Man. No	Model	Manual	Application	Description
W524	NX-EC0□□□ NX-ECS□□□ NX-PG0□□□	NX-series Position Interface Units User's Manual	Learning how to use NX-series Position Interface Units	The hardware, setup methods, and functions of the NX-series Incremental Encoder Input Units, SSI Input Units, and Pulse Output Unit are described.

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Errors and Omissions.
Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

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In the interest of product improvement, specifications are subject to change without notice.

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